



WSDOT Test Method T 124

Method for Testing Top Soils

1. SCOPE

- a. This method describes a Modified AASHTO T 88 procedure for the quantitative determination of the distribution of particle sizes in Top Soils.
- b. This method also describes the preparation procedure for the testing of the materials for PH and Organics.

2. EQUIPMENT

- a. Oven — An oven of appropriate size, capable of maintaining a uniform temperature of approximately 140°F (60°C).
- b. Balance — The balance or scale shall be sensitive to 0.1g.
- c. Sieves — A series of sieves conforming to the requirements of the Specifications for Sieves for Testing Purposes.
- d. Stirring Apparatus — A mechanically operated stirring apparatus and dispersion cup the same as described in AASHTO T 88.
- e. Hydrometer — As described in AASHTO T 88.
- f. Sedimentation Cylinders — As described in AASHTO T 88.
- g. Thermometer — As described in AASHTO T 88.
- h. Plunger — A plunger capable of reaching the bottom of the sedimentation cylinder.
- i. Dispersing Agent — 9 g of sodium hexametaphosphate made up to volume, with distilled water in a 1 L volumetric flask.

3. PROCEDURE

Soil sample as received shall be air dried (140°F (60°C) for 15 hours, \pm 4 hours). Run material on coarse screens 1 in. (25 mm) and No. 4 (4.75 mm) for 10 minutes. Record percentage of material retained on the 1 in. (25 mm) and No. 4 (4.75 mm) sieves. Split out approximately 3 lbs. (1500 g.) of No. 4 (4.75 mm) minus material for fine grading.

Split No. 4 (4.75 mm) minus material to approximately 500 g. Shake by hand on the #10 (2.00 mm) screen and mull if needed for complete separation. Record percent passing. Hand shake approximately 150 g of #10 (2.00 mm) minus material for PH testing and approximately 50 g of #100 (0.150 mm) minus material for organic content testing. These two samples are to be tested by the Chemical Lab.

Dispersion: Weigh out 40 g (\pm 0.5 g) of #10 (2.00 mm) minus, air dried soil and transfer to a 250 ml beaker. Add 190 ml of sodium hexametaphosphate solution. Let the soil-water mixture stand for at least 18 hours, but do not permit it to dry out. Using distilled water, wash soil into the dispersion cup, and add water to within 2 in. of the rim of the cup. Disperse the sample with the stirring apparatus for a period of 10 minutes.

Hydrometer Measurements: Wash the contents of the dispersion cup into a 1000 ml graduated cylinder. Place the hydrometer in the cylinder, and then add the distilled water to the 920 ml mark. Use a plunger with vigorous up and down motion to obtain a uniform suspension.

In the mixing process do not bring the perforated base of the plunger too close to the top of the water column or force it down through the column too vigorously or splashing will result and air may be introduced into the suspension. Incorporated air bubbles may cause sizeable positive errors in hydrometer readings. When the suspension is uniform, remove the plunger rapidly but carefully and start counting time as the base of the plunger clears the water surface. Insert the hydrometer quickly, but carefully, and limit bobbing with the finger tip. Record the hydrometer reading (top of the meniscus) after exactly 40 seconds. Move the hydrometer up and down in the suspension to displace soil particles which have settled on it and then remove it from the cylinder. Using the plunger, resuspend the soil, and obtain a second reading. If there is agreement within 0.5 of a scale unit, proceed to the final soil suspension; otherwise repeat the reading.

When the 40-second reading is made, sand will have settled out sufficiently so that only suspended silt and clay particles remain to influence the hydrometer level.

After two satisfactory 40-second readings have been obtained, resuspend the soil for the two hour reading which starts immediately after the plunger is removed.

About 1 minute prior to the two hour reading insert the hydrometer. Since the hydrometer was calibrated at a temperature of 68°F (20°C), data obtained at other temperatures must be corrected. Less error is introduced if the temperature is above than if it is below 68°F (20°C). Avoid extreme temperatures. Correct the observed hydrometer reading by adding a 0.2 unit for each 1° above 68°F (20°C), or subtracting a 0.2 unit for each 1° below 68°F (20°C). At each reading temperature will be taken.

Performance Exam Checklist

Particle Size Analysis of Top Soils (WSDOT TM 124)

Procedure Element	Yes	No
1. Sample air dried @ 140 F (60 C) maximum?	<input type="checkbox"/>	<input type="checkbox"/>
2. Test sample obtained by AASHTO T-248?	<input type="checkbox"/>	<input type="checkbox"/>
3. Representative sample used to fill 1/2 cubic foot bucket?	<input type="checkbox"/>	<input type="checkbox"/>
Coarse Sieve Analysis		
1. Coarse material separated on 1 inch and 1/4 inch sieve in shaker for 10 minutes?	<input type="checkbox"/>	<input type="checkbox"/>
2. Coarse material separated on 1 inch and 1/4 inch sieve in shaker for 10 minutes?	<input type="checkbox"/>	<input type="checkbox"/>
3. All material retained on the 1/4 inch sieve is placed in 1/10 cubic foot bucket?	<input type="checkbox"/>	<input type="checkbox"/>
4. If material fills 1/10 cubic foot bucket, sample is out of specification?	<input type="checkbox"/>	<input type="checkbox"/>
5. If not, percent filled, of 1/10 cubic foot bucket is recorded?	<input type="checkbox"/>	<input type="checkbox"/>
6. Approximately 3 pounds of 1/4 inch minus material is split out as a sample for fine grading?	<input type="checkbox"/>	<input type="checkbox"/>
7. Split out 500 g sample for actual grading?	<input type="checkbox"/>	<input type="checkbox"/>
8. Mull material if necessary?	<input type="checkbox"/>	<input type="checkbox"/>
9. Sieve analysis performed on material retained on the No. 10 sieve and percent passing recorded?	<input type="checkbox"/>	<input type="checkbox"/>
Samples Prepared for Testing by Others		
1. Approximately 150 g of No. 10 minus material for PH testing?	<input type="checkbox"/>	<input type="checkbox"/>
2. Approximately 50 g of No. 100 minus material for Organic Content Testing?	<input type="checkbox"/>	<input type="checkbox"/>
3. All material muller if necessary?	<input type="checkbox"/>	<input type="checkbox"/>
Hydrometer Analysis		
1. Distilled or demineralized water used thru the test?	<input type="checkbox"/>	<input type="checkbox"/>
2. Air dried sample weighs 40 ± 0.5 grams?	<input type="checkbox"/>	<input type="checkbox"/>
3. Sample placed in 250 ml beaker and 190 ml of Dispersing Agent added?	<input type="checkbox"/>	<input type="checkbox"/>
4. Sample soaked at least 18 hours in dispersing agent? (Do not allow to dry out)	<input type="checkbox"/>	<input type="checkbox"/>
5. Sample washed into dispersion cup w/distilled water to within 2 inches of the rim of the cup?	<input type="checkbox"/>	<input type="checkbox"/>
6. Dispersed for 10 minutes?	<input type="checkbox"/>	<input type="checkbox"/>
7. Mixture transferred to 1000 ml glass graduate?	<input type="checkbox"/>	<input type="checkbox"/>
8. Hydrometer placed in the glass graduate and distilled water added to the 920 ml mark?	<input type="checkbox"/>	<input type="checkbox"/>
9. Hydrometer is removed and a plunger is used to mix to uniform suspension?	<input type="checkbox"/>	<input type="checkbox"/>
10. Plunger is removed and timer started?	<input type="checkbox"/>	<input type="checkbox"/>

Procedure Element

Yes

No

11. Hydrometer immediately placed in the graduate and reading @ 40 second is recorded?
12. Hydrometer gently moved up and down then removed from graduate?
13. Steps 9 and 10 are repeated for a second, 40 second reading?
14. If the two readings do not agree within 0.5 ml, then steps 9 and 10 are repeated until they do?
15. Plunger used to remix the suspension and timer started for 2 hour reading?
16. Hydrometer placed into graduate one minute prior to 2 hour reading?
17. Temperature is taken at each reading and corrected to 68 F?

Calculations

1. Calculations performed in accordance with test method?

First attempt: Pass ☐ Fail ☐

Second attempt: Pass ☐ Fail ☐

Signature of Examiner _____

Comments:

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